G. R. S. IX-5]

Previous references.

Ind 12 of 21-22

1921.

(Dec)

File No. 56-21 A.

Serial Nos 2, 2a, 5-9

Later references.

11, 12, 12a, 17-19

GENERAL AND REVENUE SECRETARIAT.

Serial Nos. 13

Part B for Jan 22

SUBJECT.

Inventors for: Improvements in or relating to the protection of the walls of enclosures in which reactions take place under high temperatures & pressures"

(Dec 11) No. 30-31 dy 23.11.21 authorising the applicant to file a specification of the invention referred to

(Dec 17) No. 3995 dy 24.1.22 rectifying the filing of the specification of the inventor

WD 1888—GPB—16,626—23-7-21

12.21

11

G. R. S. 11] 1921.

GENERAL AND REVENUE SECRETARIAT.

(H.E.)

NOTES.

File No. 56-21.

FILE HEADING.

Inspection for:- Improvements in or relating to the protection of the walls of enclosures in which reactions take place under high temperatures & pressures".

From.

Messrs. W. Grant Rose, Solicitor 2. Hastings Street Calcutta.

No. Dated 26.7.21 Received 1.8.21

Diary No. 776 | Enclos. Appn in duplicate Drawing in duplicate Spare Copies | Serial No. 2

BRIEF ABSTRACT OF LETTER.

Forwards an application for leave to file a specification in respect of an invention described therein on behalf of his clients L'Air Liquide Societe Anonyme Pour L'Etude Et L'Exploitation des Procedes Georges Claude.

NOTES AND ORDERS.

Rs. 1. 0 Rs 12/- was received in Cash Secn on 1.8.21. Excess amount of 8/- as in respect of assignment deed refdn may be returned.

Subd with three dfts for orders.

D.P.R. Chamberlain 7/12/21

1/12/8

Messrs 13/d

NOTES—First Sheet.

31-8-21 12-11-21 (2

G. R. S. III-2]

General and Revenue Secretariat. | Ptc File No. 56 of 1921.

Serial No.	
24	From W H Ly office 424 dy 15-8-21 Acknowledges W Cheque of Rs 10/- To W. Grant Rose Esq No 1277 dy 26-8-21 Acknowledges W receipt of Appl & returns. Re ½ & states that W appl is receiving attention.
6	To The Secy, Bd of Re Advice No 1278 dy 26-8-21 Forwards W appl for opinion.
7	To The Supdtg Stamps 1279 dy 26-8-21 Forwards W Power of attorney & W deed of alienation for being impressed Stamps
8	From W Same office No 86 dy 31-8-21 Returned W documents duly Stamped.
9	From W Secretary Bd of Re Advice No 18 dy 29-10-21 Returns W application & states that W leave may be granted to file W Specification submitted with a drgs Ans 7-11-21 Issd

Res

NOTE—Contn. sheet.

7/11

12-21 29/21 776 (3

G. R. S. III-2.

General and Revenue Secretariat. | 9+c File No. 56 of 1921.

Serial No.	
11	To Grant Rose Esq 3031 & 23-11-21 Authorities & Pleading & Specification
12	From Grant Rose Esq Letter & 12-12-21 Requests that Specification may be Submitted with 3 drafts. The draft & fair copies of 11 require signature. P.R.R. will be duly entered & submitted separately Attd. 30-12-21.
A	A. Issue.
B.	B. Awaited.
	2.1.22
12(a)	T. R. R. 477 & 6.1.22 acknowledging the receipt of Rs 130/-
17	No. 3995 & 26-1.22 Notifying the Specification of the Invention referred to therein
18	No 3996 & 26.1.22 to the Grant Rose forwarding a copy of the Notification in Sl 17.
19	Nos 3997-9 & 26.1.22 to the Supdt Govt Museum, Chief Engr. Mysore, Secy Rood &c. Boards forwarding a copy of the Specification for record in their respective Offices

NOTE—Contn. sheet.

Rec'd by regd post 127 21-22

3567

Dno 776 82-8-21.

(4

Dr. 56-21-2

From

GEN & REV. SEC
1 AUG 1921

Mr. W. Grant Rose
Solicitor

2 Hastings Street
Calcutta.

To

The Chief Secretary to the Government of
His Highness the Maharaja of Mysore
General and Revenue Secretariat
Bangalore.

Calcutta 26th July 1921.

Sir,

I beg to enclose herewith the necessary papers in respect of an application to the Dewan of Mysore for leave to file a specification on behalf of my clients L'Air Liquide Societe Anonyme Pour L'Etude Et L'Exploitation Des Procedés Georges Claude in respect of an invention for "Improvements in or relating to the protection of the walls of enclosures in which reactions take place under high temperatures and pressures."

The following papers are enclosed herewith namely :-

(1) Application in duplicate

(2) Drawings one sheet in duplicate

(3) Power of attorney

(4) Assignment

(5) Specification in duplicate

I am sending you a money order for Rs.12 of which Rs.1 is for the Mysore Government Stamp on the Power of attorney and Rs.1 for the Mysore Government Stamp on the assignment

and

(5

and Rs.10 being the prescribed fee for the application.

I may mention that the present application is based on my clients Indian Patent application No.6329 of 1920 which was accepted on the 13th June 1921 but the Indian Patent has not yet been issued.

I presume that when leave is granted to file specification it will be necessary to submit two other copies of the specification in addition to those now sent.

I have the honour to be,

Sir,

Your most obedient servant,

W Grant Rose

Enclo:

6

COUPON. The remitter may write here any communication to the payee.

Rs. 12/- As. ——— Amount remitted in respect of Patent application to Dewan of Mysore on behalf of L'air Liquide corresponding to Indian Patent application No 6329 of 1920 W. Grant. Rose, Solicitor

Remitter.

(This List will be receipted and returned by Press to the Branch.)

Recorder.

MGCPB—10,000—8-4-05

(12-21)

SIC 56-21-2A

(1)

Duplicate.

(To be returned to the General and Revenue Secretariat for being placed in the file.

1. No. 424

2. Date of Remittance. 15/8/21

3. From whom received. Mr. L. Grant Rose. Solicitor. 2 Hastings Street. Calcutta.

4. Date of receipt of amount in the General and Revenue Secretariat. 1.8.21

5. On what account. Bill Fee in respect of convention No 1207 21-22

6. Amount (in figures and words). Rs 10/- ten rupees only.

7. The head to which it should be credited.

(To be filled in by the Treasury.)

Secretary to Government,
~~General~~ Edn *Department.*

The above amount has been duly received and credited in the Treasury on this date.

Date AUG 18 1921

Hd. Acctt. *Treasurer.* *Try. Officer.*

N. B.—Both the counterfoil and the duplicate to be returned to the General and Revenue Secretariat duly signed by the Treasury Department.

Dy 20 replied to 776. 12-4 No 277/Rec 1/2 Rs 5 dtd 56-21 (8)

17/8 Annuranc by mis.no. 46790 3-8-4 ann

To

W
~~The~~ Grant Rose Esq.,

Solicitor, and Hastings Street,

Calcutta.

Sir,

I am directed to acknowledge the receipt of your letter dated 26.7.21 forwarding for application for leave to file a specification on behalf of your clients L'Air Liquide Societe Anonyme pour L'Etude et L'Exploitation des Procedes Georges Claude in respect of an invention for "Improvements in or relating to the protection of the walls of enclosures in which reactions take place under high temperatures & pressures",

and to state that a sum of annas 8/- is returned herewith as the value of the stamp required for the said assignment/viz annas 8/- only. I am to add that the application is receiving the attention of Govt.

I have etc.,

13/8

for Secy. to Govt.
Edn. Dept.

* based on Indian patent Application No 6329 of 20

Dy 26/8/21

Secy mr MSK

1/12/21

Init

24/8

G. R. S. VI.—8-v/16]

DRAFT. 12-21

SUBJECT.....

.....

.....

Section. 2+c
File No. 56-21
Serial No. 6

Diary No. of letter replied to.....

No. 1278/Encls 3

To

The Secy. Bd of
S.C. Arrée
Bangalore.

GENERAL AND REVENUE SECRETARIAT,

(

, *the*.....*191*

Date of issue.....26/8/21.....

Signed by.....

Has the honor to forward herewith for report under Sec. 6, Cl. (2) of the Mysore Inventions and Designs Regulation, XI of 1894, an application for leave to file a specification of an invention for "Improvements in or relating to the protection of the walls of enclosure in which reactions take place under high temperatures & pressures" on behalf of his Clients L'Air Liquide Societe Anonyme Pour L'Etude Et L'Exploitation Des Procedes Georges Claude of 48 Rue St Lazare Paris.

By Order,

13/8/21.

For Secretary to Government.

Encl

1/12/8

List of enclosures.

Copied by.....

Examined by.....

WD 02295 -GPB—1,000—2-3-18

12-21 Amount & letter sent on 31-8-21 amra

(10)

G. R. S. VI—s.v/14]

DRAFT.

SUBJECT.....

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Section. dte
File No. 56-21
Serial No. 7

Diary No. of letter replied to.....

No 1279/Encls 2.
& Rs 1-00

GENERAL AND REVENUE SECRETARIAT
( )
, *the* 191

To

The Supdt of Stamps.
Bangalore

Date of issue 26/8/21

Signed by W.V. M.S.R.

* L'Air Liquide Societe Anonyme. Pour L'Etude Et L'Exploitation Des Procedes Georges Claude 48- Rue St Lazare Paris

Has the honor to forward herewith a Power of Attorney executed by *

constituting Mr. W. Grant Rose Solicitor - 2 Hastings St. Calcutta as Agents in respect of ~~his~~ their invention

for * x x

and to request that the same may be impressed with the Mysore General Stamp of the value of Rupee One, also herewith forwarded, and the Power returned to this office. Also a deed of assignment executed by Georges Claude in favour of the Company referred to is Sent herewith.

* x x Improvements in or relating to the protection of the walls of enclosure in which reactions take place under high temperatures & pressures"

By Order,

13/8/21

For ~~Chief~~ *Secretary to Government.*

Ed Dept

half a rupee & may kindly be impressed with the Stamps of that value & returned.

11/12/21

List of enclosures.

Copied by.....

Examined by.....

WD 02293—GPB—1,000—2-2-18

12-24 94C 56-21-8 (17

Copy of letter No. 86 dated 31st August 1921 from the Superintendent of Stamps in Mysore, Bangalore to the Secretary to Government, General Department.

I have the honour to forward herewith duly stamped eight Powers of Attorney and eight Deeds of Assignment, forwarded with your ~~xxxx~~ numbers noted in the margin and to request the favour of an acknowledgment.

No. 1266, 1270, 1272, 1275, 1279, 1282, 1285, 1287. dated the 26th August 1921.

Acknowledged vide no 1553 dt 6-9-21.

.....

(12)

POWER OF ATTORNEY.

IN THE MATTER of the Inventions and Designs Regulation, 1894, of the Government of Mysore and in the matter of L'AIR LIQUIDE, SOCIETE ANONYME POUR L'ETUDE ET L'EXPLOITATION DES PROCEDES GEORGES CLAUDE, of 48, Rue St Lazare, Paris, in the Republic of France.

We, the abovenamed, L'AIR LIQUIDE, SOCIETE ANONYME POUR L'ETUDE ET L'EXPLOITATION DES PROCEDES GEORGES CLAUDE, do hereby retain, constitute and appoint William Grant Ross of No. 2 Hastings Street in the Town of Calcutta Solicitor and Patent Agent as our Agent and Attorney to apply for and obtain from the Government of Mysore and keep in force an Exclusive Privilege or Letters Patent for "Improvements in or relating to the protection of the walls of enclosures in which reactions take place under high temperatures and pressures" and we authorise to sign our name to such papers and writings and do such acts regarding the same, including the appointment of a substitute or substitutes, as may be necessary or expedient.

Dated this 22nd day of April 1926.

THE COMMON SEAL of L'AIR LIQUIDE, SOCIETE ANONYME POUR L'ETUDE ET L'EXPLOITATION DES PROCEDES GEORGES CLAUDE was hereto affixed in the presence of:-

L'AIR LIQUIDE
Soc. Anonyme pour l'Etude et l'Exploitation
des Procédés G. Claude
48, Rue St-Lazare, 48
PARIS

"L'AIR LIQUIDE"
Soté Anme pr l'Etude et l'Exploitn des Procédés G. Claude
Un Directeur,

6329/7/1520

13

GOVERNMENT OF MYSORE 31 AG 21 18 ANNAS

ASSIGNMENT.

WHEREAS I, GEORGES CLAUDE, of 48, Rue St Lazare, Paris, in the Republic of France, Engineer, am in possession of an Invention for "Improvements in or relating to the protection of the walls of enclosures in which reactions take place under high temperatures and pressures"

Now therefore know ye that for and in consideration of the sum of five shillings to me in hand paid, the receipt of which is hereby acknowledged, I the said GEORGES CLAUDE, have assigned and transferred and by these presents do assign and transfer unto L'AIR LIQUIDE, SOCIETE ANONYME POUR L'ETUDE ET L'EXPLOITATION DES PROCEDES GEORGES CLAUDE, of 48, Rue St Lazare, Paris, in the Republic of France, their successors or Assigns, (hereinafter called "the said Assignee") the whole right, title and interest in and to Letters Patent to be obtained for the said Invention from the Government of Mysore the same to be held and enjoyed by the said Assignee to the end of the term or period for which such Letters Patent may be granted, or any prolongation or extension thereof, as fully and entirely as the same could have been held and enjoyed by me had this Assignment not been made.

IN WITNESS whereof I, the said GEORGES CLAUDE, have hereunto set my hand and seal this 22nd day of October 1920.

MYSORE GOVERNMENT 31 AG 21 GENERAL STAMPS

L'AIR LIQUIDE Société Anonyme pour l'Etude et l'Exploitation des Procédés Georges Claude PARIS 48, Rue St-Lazare

SIGNED, SEALED AND DELIVERED
at Paris
in the presence of:-

Irene Haurlet Engineer at L'air Liquide residing in Boulogne/Seine 3 Rue Alfred Lemaître

Gaston Scala Engineer at L'air Liquide residing in Paris 19 Rue Baron

(111

9 & C 56.-21-9

copy of Ltr no 18 of 29-10-21 from the Secretary, Bd of Sc Advice, to the Secretary to Govt. Bombay,

I am directed to return herewith the following 9 applications & to state that leave may be granted to file the Specifications of inventions contained therein.

1 x x x.

12-21 9 Protection of the walls of enclosures in which reactions takes place under high temperatures & pressures.

(15

Indian Dept. &c.
6329 20

PAPERS FOR APPLICATION FOR

LETTERS PATENT

IN

M Y S O R E

L'AIR LIQUIDE, SOCIETE ANONYME POUR L'ETUDE ET L'EXPLOITATION DES PROCEDES GEORGES CLAUDE.

12-94

(16

APPLICATION.

TO THE DEWAN OF MYSORE.

THE APPLICATION of L'AIR LIQUIDE, SOCIETE ANONYME POUR L'ETUDE ET L'EXPLOITATION DES PROCEDES GEORGES CLAUDE, of 48, Rue St Lazare, Paris, in the Republic of France, for leave to file a Specification under Part 1 of the Mysore Inventions and Designs Regulation, 1894.

1. The Applicants are in possession of an Invention for "Improvements in or relating to the protection of the walls of enclosures in which reactions take place under high temperatures and pressures"

they are the Assignees of the Inventor thereof; and, to the best of their information and belief, the Invention is new within the meaning of Part I of the Inventions and Designs Regulation, 1894, and no circumstance exists which, if the Applicants are authorised to file a specification and file it in accordance with that Part, will disentitle them to an Exclusive Privilege thereunder in respect of the Invention.

The Applicants have applied for a Patent in British India in respect of this Invention No. 6329 dated the 29th day of October, 1920.

2. The following is a description of the invention:

This invention relates to the protection of the walls of enclosures in which chemical reactions take place under high temperatures and pressures and in which the protection is effected by interposing between the wall of the enclosure and the chamber in which the reaction takes place, a layer of material which is liquid at the high temperatures developed.

As is well known in the art it is of the greatest importance when reactions between gases are carried on at high temperatures and under high pressures with liberation of heat which it is necessary to eliminate, especially in the synthesis of ammonia, that the wall of the vessel or enclosure in which the reactions take place and which has to resist the pressure should only be subjected to a temperature which is low enough to enable it to maintain the necessary mechanical resistance and at the same time resist the injurious action of the gases before or after the reaction. Moreover it is necessary at the same time for this wall to transmit to the exterior the heat of the reaction as liberated, in order that the heat may be absorbed by any medium placed outside the vessel subjected to the pressure. This is particularly necessary when the operations are carried out under the very high pressures which have been termed "hyper-pressures" in the specification of Patent No. 130086

For this purpose it has been proposed to separate by means of layers of known materials which are non-conductors of heat the chamber in which the reaction takes place and which is in general situated in the interior of an enclosure

from the outer resisting wall of this enclosure. There is thus created, between the chamber in which the reaction takes place and the outer wall, a fall in temperature which brings this wall to the low temperature desired. The materials however which have hitherto been employed and which are bad conductors of heat possess certain disadvantages. Some of them, such as glass or enamel, are not capable of being made of the requisite thickness without giving rise to great drawbacks in consequence of their fragility, differences of expansion etc. On the other hand those substances which owe, under ordinary circumstances, their bad conductivity to their porosity, such as sand or asbestos, have this property greatly diminished owing to the fact that the comprssed gases, notably hydrogen, fill up their interstices and thus cause them to become extremely good conductors of heat, particularly at the enormous pressures termed hyper-pressures.

The present invention has for its object to provide various methods which permit the desired result to be arrived at while avoiding the aforesaid disadvantages.

According to this invention a non-conducting medium is employed which is liquid or partially liquid at the high temperatures developed in the chamber in which the reaction takes place while this body may exist in the solid state at ordinary temperature. This medium must of course be neutral with respect to the bodies contained in the enclosure and its vapour tension must be low, at least at the lowest temperature existing in the enclosure as will be seen hereafter. The non-conducting medium which forms

a continuous layer over the wall of the enclosure, protects this wall both against too high a temperature and also against coming into contact with the gases in the enclosure. A thermic and chemical protection is thus secured mechanically.

The said medium which may, for example, be a fusible metallic chloride can be utilised alone, but preferably, the production of convection movements which would diminish its non-conducting efficiency is prevented by rendering it stationary preferably by means of a suitable solid body which may be in a powdered state. This solid body may or may not be porous provided it possesses a bad thermal conductivity and is not, of course, attacked by the medium or the bodies present. As examples of these bodies which are solid at the temperature of the enclosure, sand or magnetic oxide of iron in the very compact form which is obtained by cutting iron or steel by means of oxy-flames may be given. Their admixture with the medium may be effected in the form of a paste or pulp which will fill completely the annular space between the inner wall of the enclosure which supports the pressure and the chamber in which the reaction takes place.

The thermic protection thus secured may be completed by affording chemical protection in cases where the gases of the chamber in which the reaction takes place would be soluble in the medium employed. In fact these gases may pass slowly by diffusion through the very hot metal jacket which separates the chamber in which the reaction takes

places from the liquid or partially liquid protecting layer and from there these gases, if they might become dissolved in the medium, might reach the inner wall which supports the pressure, and, if the temperature is still sufficient, they might attack the metal of which it is composed.

In order to obviate this disadvantage, according to the present invention, there are introduced into the liquid or partially liquid wall, one or more substances capable of absorbing the gases, either physically or chemically in a form which is incapable of injuring the external metal. As an example of a wall fulfilling this double function of thermic and chemical protection in the manufacture of synthetic ammonia, may be mentioned fused caustic soda containing a certain quantity of litharge, which transforms the hydrogen into water, which is retained by the soda and would not however be injurious to the wall. As a material for rendering the medium stationary coke or magnesia in the form of powder may be employed.

The wall thus constituted acts as a protection in three ways; (1) thermically, by reducing the temperature to which the wall of the reaction enclosure is subjected, (2) mechanically, by preventing the reacting gases or products from coming directly into contact with the wall of the enclosure and attacking it, and finally (3) chemically, by absorbing such of the reacting gases or products which, owing to tne fact of their being in solution in the liquid wall, might reach the inner wall of the enclosure.

It is very difficult to find bodies which remain fusible at the very low temperature to which they may be subjected. According to the present invention the number of bodies which can be utilised can be augmented by employing certain eutectic mixtures which melt at temperatures which are considerably lower than those at which their components melt. By way of example may be cited a mixture of nearly equal parts by weight of caustic soda and potash which fuses at about 200 degrees Centigrade. This mixture might be rendered stationary by the magnetic oxide of iron above mentioned and which constitutes by itself a substance which is capable of chemically arresting the hydrogen dissolved in the liquid.

It has been stated above that in order to diminish the movements of the medium by convection, solids which render it stationary are employed: an artificial viscosity is thus secured. Another means of arriving at this end would consist in employing liquids which are themselves viscous. As however it is difficult to find liquids which remain viscous over the great range of temperatures which prevail, it would be possible to emply in place of a single liquid a succession of several viscous liquids of a suitable nature which will be superposed on one another in the order of their densities if the apparatus is vertical or inclined. It is however more convenient in practice to employ the mixture of liquids and solids hereinbefore mentioned.

In order that the said invention may be clearly

understood and readily carried into effect the same will now be described more fully with reference to the accompanying drawing which illustrates one constructional form of the invention and in which:-

A is the outer wall of the vessel or enclosures which vessel is of tubular formation and is closed at its extremities by end caps A^1, A^2. B is a steel tube located centrally of the vessel A and connected at one end to the cap A^1, its other end being fitted with a perforated disc b. Surrounding the steel tube B is a concentrically mounted steel tube C which is spaced apart from the outer wall A and from the steel tube B, the said steel tube C being open at its upper end and attached at its lower end to the casing A by a hermetically sealed joint g. Surrounding the lower end of the tube B is a coil of wire D which forms part of an electrical heating device for heating the lower end of the tube B so as to start or maintain the reaction. The reaction liberating heat, which it is necessary to remove, is carried on within the tube B which contains at its lower end a catalytic agent E. The upper part of the tube B above the catalytic agent is filled with a substance F, for example asbestos, and acts as an exchanger of temperature. Between the enclosure A and the concentric steel tube C is located the medium G which constitutes the aforesaid liquid or partially liquid wall. The gases which are to react are admitted by a side opening H at the upper end of the apparatus and following the direction of the arrows they pass downwards between the

inner and outer tubes B,C, until they arrive at the bottom of the tube A which they enter through the perforated disc h. After transversing the catalyst E and the substance F they escape from the apparatus through the opening I in the end cap A'. The external steel tube thus protected by the liquid G is surrounded by a medium, not shown, which absorbs the heat transmitted from the interior of the catalyser E.

The gases which are to react are admitted to the apparatus at the ordinary temperature and the wall of the enclosure in the vicinity of the point where they enter is not subjected to a temperature which is sufficient to bring about the thermic or chemical deterioration thereof. It will therefore be needless to cause the medium G to reach up to this region and it will suffice to arrest its level at the point where the temperature becomes injurious to the wall A. The non-conducting body G will naturally be such that it is liquid or that it melts at a temperature which is lower than the above temperature. The apparatus may be inclined, as is shown in the drawing, so that the side at which the gases enter is higher than the other and the filling of the annular space between the outer wall A and the inner tube C will be carried out up to the level N where under normal conditions a temperature will exist which is sufficient to keep the medium in a fused state, but sufficiciently low for there to be no danger of the wall situated above this level N being injured either chemically or thermically.

It will be noted that a very considerable advantage of this particular arrangement, from the point of view of the vapours of the protecting mediums which may be carried over by the gases to react results from the fact that the vapour tension to be considered is only that which corresponds to the not very high temperature which exists at the free surface of the medium, and not the much higher tension which results from the temperature of the medium in the zone of the reaction.

Of course, the working of the apparatus constructed in this way would be interfered with by the reflux in a downward direction of the ammonia which would spontaneously liquify in the zone of the cooler end of the inner tube F if the temperature there were not kept higher than the critical temperature of ammonia, which is 130 degrees Centigrade. In normal working this result can be spontaneously attained just in consequence of the non-perfect exchange of temperatures between the entering and emerging gases.

During the period of starting the reaction or if it is necessary, during the working itself, the said result may be obtained by the aid, for example of a moderate electrical heating of this end of the apparatus by means of a heater similar to the heater D.

HAVING NOW particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:-

1. The method of calorifically separating the chamber in which a chemical heat liberating reaction takes place at a high temperature and under high pressure from the pressure-resisting wall which surrounds it and which transmits the heat to the exterior, consisting in interposing between the said chamber and the said wall a medium of bad thermic conductivity which is liquid or partially liquid at the high temperatures developed in the reaction chamber and which is neutral with respect to the bodies present and of low vapour tension, such as a metallic chloride caustic soda or potash, or eutectic mixtures of these bodies.

2. A method according to Claim 1 in which a liquid is employed which is viscous at the high temperatures developed in the reaction chamber or in which a succession of several liquids is employed each of which remains viscous in the zone of the temperatures where it serves as an isolating medium.

3. A method according to claim 1 in which there is added to the medium a body which is solid at the high temperatures developed in the reaction chamber and which is neutral with respect to the bodies present, porous or non-porous, of bad thermic conductivity, and which is employed in a granular or purverulent state in such a way as to form with the medium a paste or pulp, such as sand, coke, powdered magnesia, magnetic oxide of iron.

4. In a method according to claim 1, 2 or 3 and in cases where the gases of the enclosure might dissolve in the medium employed, the addition to the medium of bodies which will absorb the said gases without injuring the wall of the enclosure, as for example litharge, the medium employed being for example caustic soda in the case of the synthesis of ammonia.

5. The herein described methods of protecting the walls of vessels or enclosures in which reactions take place under high pressures and temperatures.

(28)

3. The Applicants, therefore, apply for leave to file a Specification of the Invention pursuant to Part I of the Inventions and Designs Regulation, 1894.

THE COMMON SEAL of L'AIR LIQUIDE SOCIETE ANONYME POUR L'ETUDE ET L'EXPLOITATION DES PROCEDES GEORGES CLAUDE was hereto affixed in the presence of:-

"L'AIR LIQUIDE"
Sté Anne pr l'Etude et l'Exploitn des Procédés G.
Un Directeur.

L'AIR LIQUIDE
Ste Anne pour l'Etude et l'exploitation
48, Rue St-Lazare, 48
PARIS

We, the Applicants abovenamed, do declare that the facts stated in this Application are true to our knowledge, except as to matters stated on information and belief, and as to those matters we believe them to be true.

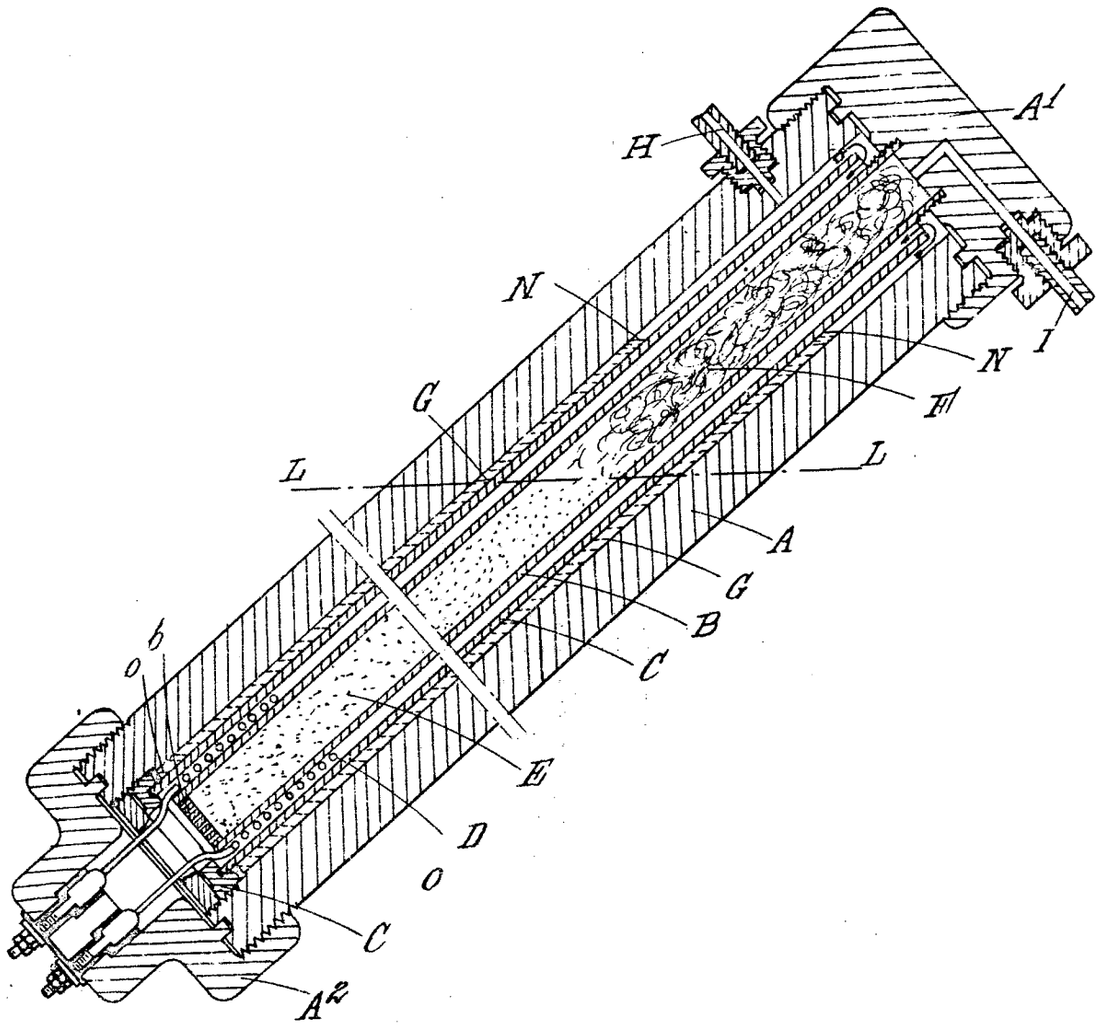
Dated this 22nd day of April 1920.

THE COMMON SEAL of L'AIR LIQUIDE, SOCIETE ANONYME POUR L'ETUDE ET L'EXPLOITATION DES PROCEDES GEORGES CLAUDE was hereto affixed in the presence of:-

"L'AIR LIQUIDE"
Sté Anne pr l'Etude et l'Exploitn des Procédés G. Claude
Un Directeur.

L'AIR LIQUIDE
Ste Anne pour l'Etude et l'exploitation
48, Rue St-Lazare, 48
PARIS

No. of Sheets - 1
Sheet No. 1.



L'Air Liquide Societe Anonyme Pour L'Etude et L'Exploitation Des Procedes Georges Claude
by their attorney
W. Grant Rose

No Lc 3031 9+c 56-21-4 (80

G. R. S.VI—s.-v/21]

Government of Mysore.

GENERAL DEPARTMENT.

Register No. 12 of 1921-22

Bangalore, the 23/11/ 1921.

(based on Indian Patent application no 6329 D 1920

WHEREAS an application, dated the 22nd April 1921, and received on the 1st August 1921, has been submitted under Section 5 of the Mysore Inventions and Designs Regulation, 1894, by L'Air Liquide, Societe Anonyme pour L'Etude et L'Exploitation des Procedes Georges Claude, of 48, Rue St Lazare, Paris,

(hereinafter referred to as "the applicant") for leave to file a specification of an invention for Improvements in or relating to the protection of the walls of enclosures in which reactions take place under high temperatures and pressures

And whereas the applicant has duly complied with all the requirements of Section 5 of the said Regulation;

The Government of Mysore are pleased, under Section 6 of the said Regulation, to authorize the applicant to file a specification of the said invention in accordance with the provisions of the said Regulation.

ORDERED, that the applicant be, and he is hereby, informed accordingly.

By Order of the Government of Mysore,

9.11.21

Secretary to the Govt. of Mysore,
General Department.

Certified that the fees prescribed in the fourth schedule to the Mysore Inventions and Designs Regulation, 1894, in respect of the application for leave to file the said specification and of the filing thereof have been paid by the applicant, and that the specification hereinbefore described has been duly filed in accordance with the provisions of Section 8 of the said Regulation on this the 17th day of December 1921.

M. Appaswamy 2.1.22

Secretary to the Govt. of Mysore,
General Department.

1914

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(Section 8 of the Inventions and Designs Regulation, 1894.)

8. (1) If within six months from the date of an order under Section 6, Sub-Section (1), or within such further time, not exceeding three months, as the Government of Mysore, in its discretion, may, on cause shown to its satisfaction and on payment of the fee prescribed in that behalf in the fourth schedule, see fit to allow, the applicant causes a specification of his invention to be filed in manner by this Part required, and the fee prescribed in the fourth schedule in respect of the filing of the specification to be paid, the applicant shall, subject to the other provisions of this Part, be entitled to the exclusive privilege of making, selling and using the invention in the Territories of Mysore, and of authorizing others so to do, for a term of fourteen years from the date of the filing of the specification.

(2) But an exclusive privilege in respect of an invention of a new manufacture shall, notwithstanding anything in Sub-Section (1), cease, if the inventor fails to pay, within the time limited in that behalf by the fourth schedule, any fee prescribed in that schedule in respect of the continuance of the privilege.

(3) If, nevertheless, in any case, by accident, mistake, or inadvertence, an inventor fails to pay any such fee within the time so limited, he may apply to the Government of Mysore for an enlargement of the time for making the payment.

(4) Thereupon the Government of Mysore may enlarge the time accordingly, on payment of the fee prescribed in that behalf in the fourth schedule, and subject to the following conditions, namely :—

(*a*) the time for making a payment shall not in any case be enlarged for more than three months ; and

(*b*) if any suit is instituted in respect of an infringement of the exclusive privilege committed after a failure to make a payment within the time limited for the making thereof and before the enlargement of that time, the Court disposing of the suit may, if it thinks fit, refuse to award or give any damages in respect of the infringement.

W D 02300—GPB—500—24-11-16

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17-12-21.

9+C 56-21-12

From

16 DEC 1921

Mr. W.Grant Rose

Solicitor

2, Hastings Street, Calcutta.

To

The Chief Secretary to the Government of

His Highness The Maharajah of Mysore

General Department

Bangalore, Mysore.

Calcutta 12th December 1921.

Sir,

Patent Register No. 12 of 1921/22

With reference to your letter No. I C 3036/I & C 60-21-9 dated the 23rd ultimo forwarding the Government order granting leave to file specification in respect of the application of L'Air Liquide &c being Register No. 12 of 1921/22 I beg to enclose herewith under registered cover two copies of the specification in respect of such application which together with the two copies of specification already submitted with the application will make four copies thereof.I also enclose one copy of the drawings which together with the two copies already sent with the application will make three copies thereof and I beg that the same may be filed in terms of the order granting leave.

I also beg to enclose herewith the Government order No I C 3031/I & C 56-21-11 Register No.12 of 1921/22 dated the 23rd November 1921 so that the certificate at foot thereof certifying that the specification has been filed and the fees paid may be duly signed and the order thus completed returned to me.

I

12-21 (4N

9 to 58-21-126)

Duplicate. D. 2981

(To be returned to the General and Revenue Secretariat for being placed in the file.

1. No. 477
2. Date of Remittance 6-1-22
3. From whom received Mr Gaoul Role Calcutta
4. Date of receipt of amount in the General and Revenue Secretariat 17-12-21
5. On what account Filing fee in respect of Suit 12-21
6. Amount (in figures and words) Rs. 30/- Rupees thirty only
7. The head to which it should be credited.

(To be filled in by the Treasury.)

for Secretary to Government,
this General Department.

The above amount has been duly received and credited in the Treasury on this date.

Date 6/1/22

Hd. Acctt. *Treasurer.* *Try. Officer.*

N. B.—Both the counterfoil and the duplicate to be returned to the General and Revenue Secretariat duly signed by the Treasury Department.

ab 12-2-1 V 2 copies (25 3 & 4/22

9 RE 56-21-17

GOVERNMENT OF HIS HIGHNESS THE MAHARAJA OF MYSORE.

GENERAL AND REVENUE SECRETARIAT

Bangalore, Dated 24/4 1922

No. 3995

NOTIFICATION.

(PATENT)

The following specification of an invention has been filed in accordance with Sections 8, 9, 10 and 11 of Regulation XI of 1894 (The inventions and Designs Regulations) and is open to inspection at the Mysore Government Secretariat on application to the ~~Chief~~ Secretary to the Government of His Highness the Maharaja of Mysore and on payment of a fee of one Rupee.

General Dept

By Liti Liquide, Societe Anonyme pour L'Etude et L'Exploitation des procedes Georges Claude, of 48, Rue St Lazare, Paris.

"Improvements in or relating to the protection of the walls of enclosures in which reactions take place under high temperatures and pressures"

By Order,

2.4.22

~~To Chief~~ Secretary to Government.

To

The Compiler, Mysore Gazette, for publication.

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20-1-22

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G. R. S. VI—s-v/18 .

DRAFT.

SUBJECT.....

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No.

Section. 9 te
File No. 56-21
Serial No. 18

Diary No. of letter replied to.....

no. 3996 (2)

GENERAL AND REVENUE SECRETARIAT
( )
the.....*191* .

To

W. Grant Rose Esq
Solicitor
2 Hastings Street
Calcutta

Date of issue 24/1/22

Signed by W J A G

Sir,

With reference to your letter dated 12-1-21, I am directed to forward copy of a Notification No. 1C3995/9te dated 56-21-17 87 24-1-22 issued by this Government in regard to the invention filed by you under Regulation XI of 1894. (The Inventions and Designs Regulations.)

The order granting permission to file specification is herewith returned, with the certificate at foot, duly filled in and signed.

I have, etc.,

24.1.22

Secretary to Government.

31-22

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3 bills

G. R. S. VI—G/32]

SUBJECT.....

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.....

Diary No. of letter replied to.....

General and Revenue Secretariat

( )

, *the* 191 . .

Date of issue 24/11/22

Signed by Jr J AG

Section Fte

File No. 56-21

Serial No. 19

No. 3997-9/ace to each

To 1/ The Supdt, Govt Museum
2/ Bench Engineer & Mysore
3/ The Secy, Bd of Sc Advice

Has the honor to forward herewith for record in his office copy of a specification of an invention for "Improvements in or relating to the protection of the walls of enclosures in which reactions take place under high temperatures & pressures" by Litis Liquide, Societe Anonyme pour L'Etude et L'Exploitation des Procedes Georges Claude, of 48, Rue St-Lazare Paris. & c

By order

Secy to Govt, G & Pol

Ind

20-1-22

List of enclosures.

Copied by

Examined by

6329 / 1920

APPLICATION.

TO THE DEWAN OF MYSORE.

THE APPLICATION of L'AIR LIQUIDE, SOCIETE ANONYME POUR L'ETUDE ET L'EXPLOITATION DES PROCEDES GEORGES CLAUDE, of 48, Rue St Lazare, Paris, in the Republic of France, for leave to file a Specification under Part 1 of the Mysore Inventions and Designs Regulation, 1894.

1. The Applicants are in possession of an Invention for "Improvements in or relating to the protection of the walls of enclosures in which reactions take place under high temperatures and pressures"

they are the Assignees of the Inventor thereof; and, to the best of their information and belief, the Invention is new within the meaning of Part I of the Inventions and Designs Regulation, 1894, and no circumstance exists which, if the Applicants are authorised to file a specification and file it in accordance with that Part, will disentitle them to an Exclusive Privilege thereunder in respect of the Invention.

The Applicants have applied for a Patent in British India in respect of this Invention No. 6329 dated the 29th day of October, 1920.

2. The following is a description of the invention:

This invention relates to the protection of the walls of enclosures in which chemical reactions take place under high temperatures and pressures and in which the protection is effected by interposing between the wall of the enclosure and the chamber in which the reaction takes place, a layer of material which is liquid at the high temperatures developed.

As is well known in the art it is of the greatest importance when reactions between gases are carried on at high temperatures and under high pressures with liberation of heat which it is necessary to eliminate, especially in the synthesis of ammonia, that the wall of the vessel or enclosure in which the reactions take place and which has to resist the pressure should only be subjected to a temperature which is low enough to enable it to maintain the necessary mechanical resistance and at the same time resist the injurious action of the gases before or after the reaction. Moreover it is necessary at the same time for this wall to transmit to the exterior the heat of the reaction as liberated, in order that the heat may be absorbed by any medium placed outside the vessel subjected to the pressure. This is particularly necessary when the operations are carried out under the very high pressures which have been termed "hyper-pressures" in the specification of Patent No. 130086.

For this purpose it has been proposed to separate by means of layers of known materials which are non-conductors of heat the chamber in which the reaction takes place and which is in general situated in the interior of an enclosure

from the outer resisting wall of this enclosure. There is thus created, between the chamber in which the reaction takes place and the outer wall, a fall in temperature which brings this wall to the low temperature desired. The materials however which have hitherto been employed and which are bad conductors of heat possess certain disadvantages. Some of them, such as glass or enamel, are not capable of being made of the requisite thickness without giving rise to great drawbacks in consequence of their fragility, differences of expansion etc. On the other hand those substances which owe, under ordinary circumstances, their bad conductivity to their porosity, such as sand or asbestos, have this property greatly diminished owing to the fact that the comprssed gases, notably hydrogen, fill up their interstices and thus cause them to become extremely good conductors of heat, particularly at the enormous pressures termed hyper-pressures.

The present invention has for its object to provide various methods which permit the desired result to be arrived at while avoiding the aforesaid disadvantages.

According to this invention a non-conducting medium is employed which is liquid or partially liquid at the high temperatures developed in the chamber in which the reaction takes place while this body may exist in the solid state at ordinary temperature. This medium must of course be neutral with respect to the bodies contained in the enclosure and its vapour tension must be low, at least at the lowest temperature existing in the enclosure as will be seen hereafter. The non-conducting medium which forms

a continuous layer over the wall of the enclosure, protects this wall both against too high a temperature and also against coming into contact with the gases in the enclosure. A thermic and chemical protection is thus secured mechanically.

The said medium which may, for example, be a fusible metallic chloride can be utilised alone, but preferably, the production of convection movements which would diminish its non-conducting efficiency is prevented by rendering it stationary preferably by means of a suitable solid body which may be in a powdered state. This solid body may or may not be porous provided it possesses a bad thermal conductivity and is not, of course, attacked by the medium or the bodies present. As examples of these bodies which are solid at the temperature of the enclosure, sand or magnetic oxide of iron in the very compact form which is obtained by cutting iron or steel by means of oxy-flames may be given. Their admixture with the medium may be effected in the form of a paste or pulp which will fill completely the annular space between the inner wall of the enclosure which supports the pressure and the chamber in which the reaction takes place.

The thermic protection thus secured may be completed by affording chemical protection in cases where the gases of the chamber in which the reaction takes place would be soluble in the medium employed. In fact these gases may pass slowly by diffusion through the very hot metal jacket which separates the chamber in which the reaction takes

places from the liquid or partially liquid protecting layer and from there these gases, if they might become dissolved in the medium, might reach the inner wall which supports the pressure, and, if the temperature is still sufficient, they might attack the metal of which it is composed.

In order to obviate this disadvantage, according to the present invention, there are introduced into the liquid or partially liquid wall, one or more substances capable of absorbing the gases, either physically or chemically in a form which is incapable of injuring the external metal. As an example of a wall fulfilling this double function of thermic and chemical protection in the manufacture of synthetic ammonia, may be mentioned fused caustic soda containing a certain quantity of litharge, which transforms the hydrogen into water, which is retained by the soda and would not however be injurious to the wall As a material for rendering the medium stationary coke or magnesia in the form of powder may be employed.

The wall thus constituted acts as a protection in three ways; (1) thermically, by reducing the temperature to which the wall of the reaction enclosure is subjected, (2) mechanically, by preventing the reacting gases or products from coming directly into contact with the wall of the enclosure and attacking it, and finally (3) chemically, by absorbing such of the reacting gases or products which, owing to the fact of their being in solution in the liquid wall, might reach the inner wall of the enclosure.

It is very difficult to find bodies which remain fusible at the very low temperature to wnich they may be subjected. According to the present invention the number of bodies which can be utilised can be augmented by employing certain eutectic mixtures which melt at temperatures which are considerably lower than those at which their components melt. By way of example may be cited a mixture of nearly equal parts by weight of caustic soda and potash which fuses at about 200 degrees Centigrade. This mixture might be rendered stationary by the magnetic oxide of iron above mentioned and which constitutes by itself a substance which is capable of chemically arresting the hydrogen dissolved in the liquid.

It has been stated above that in order to diminish the movements of the medium by convection, solids which render it stationary are employed: an artificial viscosity is thus secured. Another means of arriving at tnis end would consist in employing liquids which are themselves viscous. As however it is difficult to find liquids which remain viscous over the great range of temperatures wnich prevail, it would be possible to emply in place of a single liquid a succession of several viscous liquids of a suitable nature which will be superposed on one another in the order of their densities if the apparatus is vertical or inclined. It is however more convenient in practice to employ the mixture of liquids and solids hereinbefore mentioned.

In order that the said invention may be clearly

understood and readily carried into effect the same will now be described more fully with reference to the accompanying drawing which illustrates one constructional form of the invention and in which:-

A is the outer wall of the vessel or enclosures which vessel is of tubular formation and is closed at its extremities by end caps A^1,A^2. B is a steel tube located centrally of the vessel A and connected at one end to the cap A^1, its other end being fitted with a perforated disc h. Surrounding the steel tube B is a concentrically mounted steel tube C which is spaced apart from the outer wall A and from the steel tube B, the said steel tube C being open at its upper end and attached at its lower end to the casing A by a hermetically sealed joint g. Surrounding the lower end of the tube B is a coil of wire D which forms part of an electrical heating device for heating the lower end of the tube B so as to start or maintain the reaction. The reaction liberating heat, which it is necessary to remove, is carried on within the tube B which contains at its lower end a catalytic agent E. The upper part of the tube B above the catalytic agent is filled with a substance F, for example asbestos, and acts as an exchanger of temperature. Between the enclosure A and the concentric steel tube C is located the medium G which constitutes the aforesaid liquid or partially liquid wall. The gases which are to react are admitted by a side opening H at the upper end of the apparatus and following the direction of the arrows they pass downwards between the

inner and outer tubes B,C, until they arrive at the bottom of the tube A which they enter through the perforated disc h. After transversing the catalyst E and the substance F they escape from the apparatus through the opening I in the end cap A'. The external steel tube thus protected by the liquid G is surrounded by a medium, not shown, which absorbs the heat transmitted from the interior of the catalyser E.

The gases which are to react are admitted to the apparatus at the ordinary temperature and the wall of the enclosure in the vicinity of the point where they enter is not subjected to a temperature which is sufficient to bring about the thermic or chemical deterioration thereof. It will therefore be needless to cause the medium G to reach up to this region and it will suffice to arrest its level at the point where the temperature becomes injurious to the wall A. The non-conducting body G will naturally be such that it is liquid or that it melts at a temperature which is lower than the above temperature. The apparatus may be inclined, as is shown in the drawing, so that the side at which the gases enter is higher than the other and the filling of the annular space between the outer wall A and the inner tube C will be carried out up to the level N where under normal conditions a temperature will exist which is sufficient to keep the medium in a fused state, but sufficiciently low for there to be no danger of the wall situated above this level N being injured either chemically or thermically.

It will be noted that a very considerable advantage of this particular arrangement, from the point of view of the vapours of the protecting mediums which may be carried over by the gases to react results from the fact that the vapour tension to be considered is only that which corresponds to the not very high temperature which exists at the free surface of the medium, and not the much higher tension which results from the temperature of the medium in the zone of the reaction.

Of course, the working of the apparatus constructed in this way would be interfered with by the reflux in a downward direction of the ammonia which would spontaneously liquify in the zone of the cooler end of the inner tube F if the temperature there were not kept higher than the critical temperature of ammonia, which is 130 degrees Centigrade. In normal working this result can be spontaneously attained just in consequence of the non-perfect exchange of temperatures between the entering and emerging gases.

During the period of starting the reaction or if it is necessary, during the working itself, the said result may be obtained by the aid, for example of a moderate electrical heating of this end of the apparatus by means of a heater similar to the heater D.

HAVING NOW particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:-

1. The method of calorifically separating the chamber in which a chemical heat liberating reaction takes place at a high temperature and under high pressure from the pressure-resisting wall which surrounds it and which transmits the heat to the exterior, consisting in interposing between the said chamber and the said wall a medium of bad thermic conductivity which is liquid or partially liquid at the high temperatures developed in the reaction chamber and which is neutral with respect to the bodies present and of low vapour tension, such as a metallic chloride caustic soda or potash, or eutectic mixtures of these bodies.

2. A method according to Claim 1 in which a liquid is employed which is viscous at the high temperatures developed in the reaction chamber or in which a succession of several liquids is employed each of which remains viscous in the zone of the temperatures where it serves as an isolating medium.

3. A method according to claim 1 in which there is added to the medium a body which is solid at the high temperatures developed in the reaction chamber and which is neutral with respect to the bodies present, porous or non-porous, of bad thermic conductivity, and which is employed in a granular or purverulent state in such a way as to form with the medium a paste or pulp, such as sand, coke, powdered magnesia, magnetic oxide of iron.

4. In a method according to claim 1, 2 or 3 and in cases where the gases of the enclosure might dissolve in the medium employed, the addition to the medium of bodies which will absorb the said gases without injuring the wall of the enclosure, as for example litharge, the medium employed being for example caustic soda in the case of the synthesis of ammonia.

5. The herein described methods of protecting the walls of vessels or enclosures in which reactions take place under high pressures and temperatures.

3.The Applicants, therefore, apply for leave to file a Specification of the Invention pursuant to Part I of the Inventions and Designs Regulation, 1894.

THE COMMON SEAL of L'AIR LIQUIDE SOCIETE ANONYME POUR L'ETUDE ET L'EXPLOITATION DES PROCEDES GEORGES CLAUDE was hereto affixed in the presence of:-

"L'AIR LIQUIDE"
Soc. Anne pr l'Etude et l'Exploitation des Proc.
Un Directeur.

L'AIR LIQUIDE
Soc Anne pour l'Etude et l'Exploitation
Rue St-Lazare, 48
PARIS

We, the Applicants abovenamed, do declare that the facts stated in this Application are true to our knowledge, except as to matters stated on information and belief, and as to those matters we believe them to be true.

Dated this 22nd day of April 1926.

THE COMMON SEAL of L'AIR LIQUIDE, SOCIETE ANONYME POUR L'ETUDE ET L'EXPLOITATION DES PROCEDES GEORGES CLAUDE was hereto affixed in the presence of:-

"L'AIR LIQUIDE"
Soc. Anne pr l'Etude et l'Exploitation des Procédés G. Claude
Un Directeur.

L'AIR LIQUIDE
Soc Anne pour l'Etude et l'Exploitation
Rue St-Lazare, 48
PARIS